



PATENT  
Docket No. 204552016410

CERTIFICATE OF HAND DELIVERY

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IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In the application of:

Toshiyuki OKUMURA

Serial No.: 10/050,078

Filing Date: January 17, 2002

For: GALLIUM NITRIDE  
SEMICONDUCTOR LIGHT EMITTING  
DEVICE HAVING MULTI-QUANTUM-  
WELL STRUCTURE ACTIVE LAYER,  
AND SEMICONDUCTOR LASER  
LIGHT SOURCE DEVICE

Examiner: not yet assigned

Group Art Unit: not yet assigned

**SUPPLEMENTAL PRELIMINARY AMENDMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

In addition to the amendments filed in the Preliminary Amendment dated January 17, 2002, please further amend the application as follows:

**IN THE CLAIMS**

Add new claims 26-36 as follows:

26. A gallium nitride semiconductor laser device having emission wavelengths within a band corresponding to ultraviolet to green, comprising a semiconductor substrate, an active layer having a quantum well structure and made of a nitride semiconductor containing at least indium

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and gallium, and a first cladding layer and a second cladding layer for sandwiching the active layer therebetween, wherein

the active layer forms an oscillating section of the semiconductor laser device and consists of two to four quantum well layers and one to three barrier layers each interposed between the quantum well layers, and one or more of the barrier layers has a layer thickness of 4 nm or less.

27. The gallium nitride semiconductor laser device according to claim 26, wherein each of the quantum well layers has electrons and holes uniformly distributed therein.

28. The gallium nitride semiconductor laser device according to claim 26, wherein each quantum well layer has a layer thickness of 10 nm or less.

29. The gallium nitride semiconductor laser device according to claim 26, wherein said nitride semiconductor forming said active layer consists essentially of nitrogen, indium and gallium.

30. The gallium nitride semiconductor laser device according to claim 26, wherein the semiconductor laser device is a self-oscillating semiconductor laser device.

31. The gallium nitride semiconductor laser device according to claim 26, further comprising a driving circuit for injecting an electric current into the semiconductor laser device.

32. The gallium nitride semiconductor laser device according to Claim 31, wherein the electric current is a modulated current and a modulation frequency of the current is 300 MHz or more.

33. The gallium nitride semiconductor laser device according to claim 26, wherein said laser device generates a modulated optical output when an electric current is injected into said laser device.

34. (New) A gallium nitride semiconductor laser device having emission wavelengths within a band corresponding to ultraviolet to green, comprising a semiconductor substrate, an active layer having a quantum well structure and made of a nitride semiconductor containing at least indium and gallium, and a first cladding layer and a second cladding layer for sandwiching the active layer therebetween, wherein

the active layer forms an oscillating section of the semiconductor laser device and consists of two to four quantum well layers and one to three barrier layers each interposed between the quantum well layers, and wherein one of the first and second cladding layers is a p-type cladding layer, and the p-type cladding layer has a ridge portion and a planar portion on opposite sides of the ridge portion.

35. The gallium nitride semiconductor laser device according to claim 34, wherein the ridge has a width of about 1  $\mu\text{m}$  to 5  $\mu\text{m}$ .

36. The gallium nitride semiconductor laser device according to claim 34, wherein said planar portion has a film thickness of 0.05  $\mu\text{m}$  to 0.5  $\mu\text{m}$ .

### REMARKS

Applicant submits this Supplemental Preliminary Amendment to add further coverage of his invention.

In the event that the transmittal letter is separated from this document and the Patent and Trademark Office determines that an extension and/or other relief is required, applicant petitions for any required relief including extensions of time and authorizes the Commissioner to charge the cost of such petitions and/or other fees due in connection with the filing of this document to Deposit Account No. 03-1952, Ref. 204552016410.

Respectfully submitted,

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